REMARKS

The Examiner rejected all pending claims (1 to 28) over Hosotani in view of Ujiie.

In setting forth this rejection, the Examiner stated that Hosotani teaches a tool head moveable in X and Y directions and a component platform moveable in X and Y directions.

The Examiner then stated that Ujiie teaches a positioning system that simultaneously views an electronic component (thereabove) and a printed circuit board (therebelow).

The Examiner concluded that the presently claimed invention was an obvious combination of the Hosotani and Ujiie systems.

Section 103 Rejections:

(a) The Presently Claimed Invention:

Independent claims 1, 16, and 27 (as amended) each set forth:

(1) a tool head that is positionable in X and Y directions; and
(2) a component platform that is positionable in X and Y directions.

Independent claim 26 sets forth:

(1) a manually positionable tool head; and
(2) a manually positionable component platform.

(b) The Cited Art Distinguished:

Part I – Claims 1, 16, and 27:

Claims 1, 16 and 27 set forth both: (1) the tool head being positionable in X and Y directions, and (2) the component platform being positionable in X and Y directions.

As will be explained, an advantage of having both the tool head and the component platform positionable in both X and Y directions is that the present invention provides a simple, yet highly accurate alignment system in which alignment can be achieved using only manual controls.

The Examiner states that Hosotani teaches a tool head that is positionable in X and Y directions. This is true. Specifically, bonding head 15 moves in X, Y and Z directions. (See Col. 9, lines 41 to 44).

The Examiner then states that Hosotani also teaches a component platform that is positionable in X and Y directions. This is not true. Specifically, referring to Fig. 1, Hosotani's circuit board 16 is held onto bonding stage 17 which is fixed onto slide base 18 which moves only in the Y direction (See Col. 9, lines 50 to 52). Note: such Y directional movement of slide base 18 is simply used to load circuit board 16 into the working area of the device. There is no side-to-side (i.e.: X direction) movement of slide base 18 within the device.

Hosotani's optical system 19 is movable in both X and Y directions. (See Col. 9, lines 59 to 61). Thus, Hosotani provides alignment through the combination of: (1) an X-Y

moveable tool head, (2) an X-Y moveable optical system, and (3) a Y only moveable component platform.

There are numerous disadvantages to such an alignment approach. For example, both coarse and fine alignment between the toll head and the component board is provided by only moving the tool head. Thus, any vibration in the tool head will make this alignment more difficult.

In contrast, with the present invention, coarse alignment can be provided by first moving the tool head, followed by fine alignment by moving the component platform. This is very advantageous in that the component platform is larger (and thus less likely to vibrate) than the tool head, making the fine alignment step much easier. In addition, by stopping all movement of the tool head after performing coarse alignment, the present invention avoids the need for fine tuning positional adjustment screws/mechanisms to be attached to the tool head. The addition of such fine tuning positional adjustment screws/mechanisms to the tool head would tend to make the tool head more likely to vibrate.

As a result, the present invention can be used with manual adjustment systems providing the complete alignment.

The Applicants note there are various embodiments to the Hosotani system. However, each of these embodiments have the same one directional (i.e.: Y-directional) movement of the component platform / slide base. For example, the embodiment shown in Fig. 8 includes: a bonding head (tool head) 231 that is movable in X-Y directions (See Col. 17, line 50); an optical system 239 that is movable in X-Y directions (See Col. 18, line 15); and a bonding stage 232 that is fixed onto a slide base 233 that moves only in the Y direction (See Col. 17,

line 57 to 59). There is no mechanism provided in Hosotani to move bonding stage 232 in the X direction.

Note: loader conveyors 237 are only used to load successive circuit boards 224 onto bonding stage 232 (See Col. 18, lines 1 to 6). As such, the circuit boards 224 are loaded onto bonding stage 232 prior to the bonding stage being moved in the Y direction into the working area of the device.

In view of the above difference between the present invention's X-Y movement of its component platform during alignment, and Hosotani's one directional (i.e.: Y directional) movement of its bonding stage, the Applicants respectfully request withdrawal of the present obviousness rejections to claims 1, 16 and 27 (and all claims depending therefrom).

Part II – Claim 26:

Independent claim 26 sets forth both of the tool head and the component platform being manually positionable.

As explained above, the present invention provides rapid, accurate alignment with a simple, easy to use manual system. Specifically, the tool head first can be manually positioned so as to provide coarse component-to-board alignment. Then, the movement of the tool head is stopped and the component platform is manually positioned so as to provide fine component-to-board alignment. Such alignment is performed while simultaneously viewing both the tool head and the component platform through the present optical system.

In contrast, Hosotani provides a large, bulky and complex system (that is both expensive to manufacture and expensive to maintain). There is no provision in Hosotani for either of the bonding head (i.e.: tool head) or bonding stage (i.e.: component platform) to be manually positionable. This is because both coarse and fine component-to-board alignment is provided by solely by movement of the tool head.

To perform fine positional alignment, Hosotani therefore requires a complex system of servo motors, image recognition systems, and a "calibration stage" (being element 20 that affixed to slide base 18, with claws 20a).

Moreover, any vibration of Hosotani's tool head will make fine positional alignment difficult. In contrast, the present invention avoids such problem by instead manually moving the (heavier) component platform which is less prone to vibrate.

In view of the above difference between the present invention's simple manual positioning / alignment system, and Hosotani's complex automated alignment system, the Applicants respectfully request withdrawal of the present obviousness rejection to claim 26. In addition, the Applicants also urge that allowability of dependent claims 7, 18, 20 and 28 both as depending from allowable base claims, and also as setting forth manual alignment features of the invention which could not be provided by the Hosotani system.

Conclusion:

For the reasons presented above, all claims are believed to be in condition for allowance. A Notice of Allowance is therefore respectfully requested.

Should the Examiner feel that a telephone conference would advance prosecution of the present application, he is invited to call the undersigned attorney at the number listed below.

Respectfully submitted,

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Date: June 15, 2004

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